MIRACLE OF THE MODERN SKYSCRAPER'S GROWTH

Forty-one Stories Rushed Up in Eight Months—Risks Ironworkers Delight In at Dizzy Heights—Surprising Figures—Is the 2,000 Foot Building Coming?

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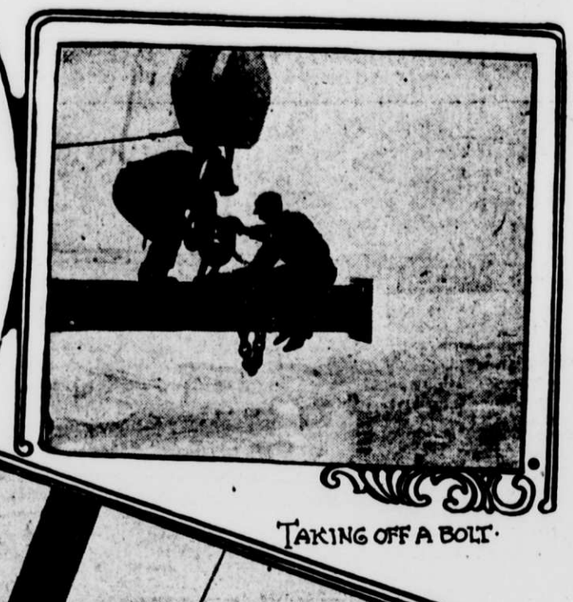
BROADWAY FROM THE TWENTY-NINTH STORY.

A DANGEROUS ELEVATOR.



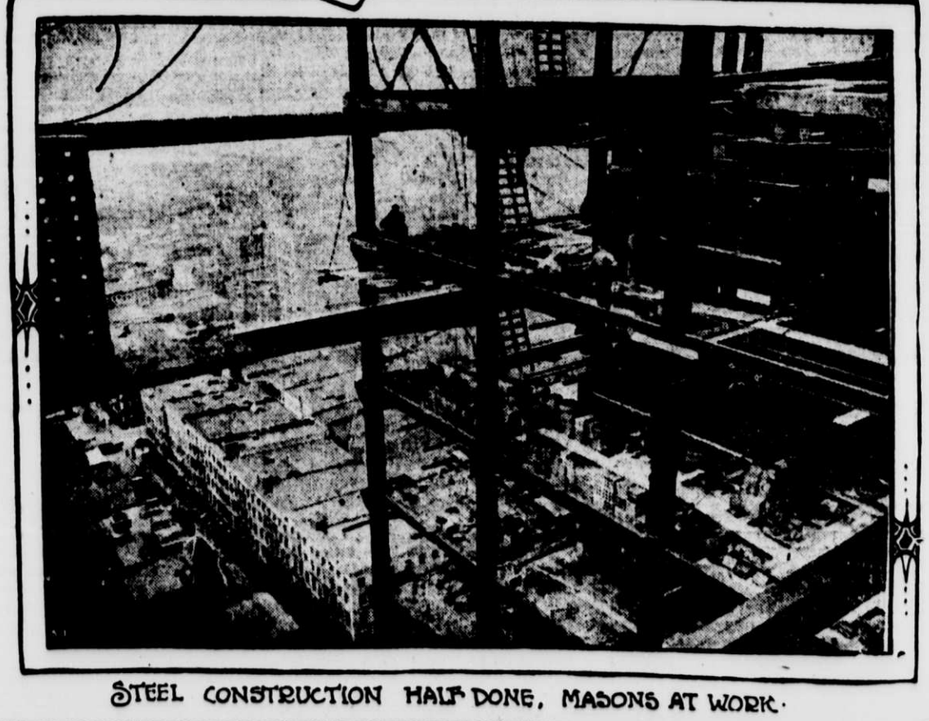
TAKING OFF A BOLT.

POTTING A GIRDER IN PLACE.

THERE ARE NO LIFE NETS FOR THE IRON WORKERS.

ALMOST IN PLACE.

PHOTOGRAPHS EDWIN LEVICK, N.Y.



STEEL CONSTRUCTION HALF DONE, MASONS AT WORK.

Showing a mountain of steel and stone bodily up into the blue sky is the modern miracle which makes even New York stop, look and listen, as they say at the railroad crossings. At the base of that particular mountain which is to be the Woolworth Building there comes down to the crowd of spellbound loiterers a constant succession of rat-tat-tats, sounding like a giant telegraph instrument passing the time of day with Mars.

It is the song of the steel riveters who are laddering up into the atmosphere at the rate of a floor a week. Crawling up the steel skeleton in the wake of the ironworkers is the casing of terra cotta. It builds itself as if it were a great coral sheath deposited by myriad workers. And when it has climbed to its uttermost peak, as it will this summer, it will set the highest mark in the history of the world's commercial buildings.

When that top most peak is reached the spectators down in the street will be sure of seeing something interesting if they look up at the right minute. For just as soon as the steel skeleton is finished it is dead certain that the first workman that can climb to its top will be there, standing erect on his dizzy perch. And it is ten chances to one that this invader of the clouds will be a son of Ireland.

Most of the structural ironworkers, the men who put up steel spider webs and then nonchalantly stroll around on the lofty threads, are Irish. A fair proportion of them are Swedes, "Squareheads" their fellow workers call them. It's a toss up as to which of the nationalities is the more daring, but on the whole the Irish are more inclined to take chances.

A man who has superintended the construction of some of the tallest buildings in the city—and that means in the world—said that an incident which occurred here in New York not long ago was an illustration of the way the two nationalities divided the honors of this particular kind of courage. The steel columns for the top stories of a skyscraper had just been set at the corners.

Risked Their Lives.

They stood up stark and alone, not a thing near them. Each column was about fifty feet high, and its top was about eight inches square. The workmen found out that the building was to be photographed and two of them "shinned up" these corner columns, one on each of them, and stood erect on the eight inch space at the top. The man at one corner was an Irishman, the other was a Swede.

You can't stand long in the crowd that is always watching the ironworkers aloft without hearing some one wonder whether they ever lose their nerve. Even the most seasoned workman may lose his nerve and lose it at a moment so critical that it is a matter of life and death with him. A man who has been engaged in skyscraper construction for years told the reporter that while the thing doesn't happen often it is an ever present possibility.

"It has happened to me three times. Once I was walking along a steel ridge beam which was 125 feet above the floor. There were no intervening scaffoldings or anything; just 125 feet of air. The beam was six inches wide and there wasn't a thing on either side of it. It was supported only at the ends. Another man and I started to walk this beam from one end to the other. Not just to do the stunt and show off. We were simply taking the most direct route to a point we had to reach.

"He was ahead of me and suddenly I lost my nerve. I can't explain it except that perhaps he got a little further away from me than he had been and I realized it with a sudden shock. You can't explain how the thing happens. There isn't any warning. It's just that your nerve is gone just as if you'd been standing on a rock one minute and on nothing at all the next.

Suddenly Lost Nerve.

"What did I do? I sat down! And I was mighty sudden about it too. I wrapped my knees around the beam and held on while I called to the man ahead of me. I told him what had happened and he came back and talked to me a while till I partly recovered control of myself. Then I stood up again on the beam and walked to the end of it. After an experience of that sort you don't get your nerve back right away. Perhaps for a week or two you don't go around in ticklish places with quite the same confidence. But I don't know of a case where a sudden attack like that has made a man permanently incapable of doing that sort of work.

"Another time I was in Chicago seeing to the erection of a big hotel. The frame was up and the cornice on. Also I was on the cornice, siting on it with my feet dangling a couple of hundred feet above the pavement. I was leaning down taking a measurement when I was suddenly seized with the impulse to jump. Of course that is not an uncommon impulse with ordinary persons when they find themselves at a great height, but it is one to which we men on skyscrapers cannot afford to be subject. I threw myself backward and called to a man to come and hold me. He pulled me away from the edge and that was all there was to it.

"Somebody asked me whether a workman who suddenly loses his nerve tries to conceal the fact from the rest. Why, you can't hide it. It never happens except when its loss means imminent danger. Losing your nerve isn't just feeling uneasy. It simply grips you and you've got to have help if there's any to be had. And yet there aren't many accidents due to that sort of thing.

"As for the workmen, we try our best to keep them from taking chances, but they will do it. For instance, I have tried to prohbit them riding up through the air when steel beams are being hauled up by the derrick. But you can't keep them from it. They see it starting and know it's bound for the same floor they want to reach and they climb aboard. The cables may break, the chain around the beam may break, or the beam may slip; not enough perhaps to fall itself, but enough to throw them off.

Must Get Used to Job.

"There's one curious thing about this kind of a job. You can go into the most dangerous places and do the most risky things in a building if you have grown up with it. If you have been on the job from the start you don't seem to feel any more fear on the fortieth floor than you did on the first. At least I don't. But if I should go into a building that was strange to me I wouldn't be able to walk around on its beams with much more confidence than the average person. You don't know where a beam is going, how it has been riveted, or anything about it. I suppose that unconsciously prevents your having confidence, and confidence is absolutely all there is to it.

"The men who go into this work, so far as I can find out, have in a way trained for it from their boyhood. Not directly, perhaps; but they have lived a life full of rough experiences, experiences that called out all their self-reliance and independence. For the actual structural work the best workmen are probably from 20 to 40 years old. After a man gets to be 45 he isn't as agile as he was.

One of the most interesting points, at least to the tenants, in connection with high buildings is the presence or absence of vibration. Some buildings are much more rigid than others. Almost any of the steel skeletons "give" to a considerable extent when under stress during construction. One builder said that a certain frame on which he worked would lean fourteen inches when the derrick would be boomed out over the street to bring up a load. Of course it returned to place when the strain was removed, and the same structure is absolutely rigid now that the walls are up.

Vibrated Nine Inches.

A building in Chicago that seems to have the record for vibration was a deep narrow one (only thirty feet wide), which was unsheltered by other tall structures. When a high wind took it broadside the disturbance was so great that the tenants got frightened and had tests made. These showed an extreme variation in the top story of nine inches from the perpendicular. Apparently the tenants were worthy citizens of the windy city, for they seemed quite reassured and stayed on as calmly as if they were not being treated to free swings every little while.

New Yorkers appear to be more conservative. A building which was recently torn down had a way of vibrating in a blow, and according to top floor tenants this vibration was in the neighborhood of a foot! Careful tests, however, proved that the vibration was only a sixteenth of an inch. Even that was enough to disturb the sensitive metropolitan nerves.

The Woolworth Building will set the high mark up to date, but the climbing 540 feet into the air and digging four stories down into the precious soil of the heart of the world's financial life. The great vault here is classed as the strongest possessed by any banking institution. The side walls have a four inch drill proof steel lining and two feet of solid concrete in which steel rails are imbedded.

Compared with the square built, granite faced, tomb topped structure the Woolworth Building is as melodramatic and picturesque as a jewel casket compared with a strong box. But it is a jewel casket for the Queen of the Brobdingnags. There will be 24,000 tons of steel in the framework. The caissons supporting it were driven 110 feet down to bedrock. Some of them are 19 feet in diameter. Almost ten months were occupied in this caisson work alone. The men who labored in them were constantly under the supervision of a physician on the spot, an addition to the construction force of a building which would have astonished the world twenty years ago.

They haven't yet got to figuring out what miles and acres and tons of things will go into the latest of the skyscrapers. skyscraper of to-day is the humble back number of the day after to-morrow. The era of skyscraper construction began with the stupendous achievement of putting up an eleven story steel skeleton structure, appropriately called the Tower Building, about twenty-two years ago. From that eleven stories to the fifty-five of to-day is some climbing.

The Gillender Building, twenty stories in height, was the tallest one in town when it was erected about fifteen years ago, but they knocked it down as unceremoniously as if it had been a frame shanty when they began last year to put up the Bankers Trust Building. The constructing company which paradoxically undertook the destruction of the Gillender Building made a record in tearing it down. The granite in it they very appropriately sold to a Brooklyn cemetery.

The Woolworth Building is of course the most sensational development of the twentieth century in commercial construction. The Bankers Trust Building, in contrast, is a sobersided, conservative, solid building—with an imitation mausoleum on top! That's a fact. The curious step pyramid in which the structure terminates is a copy of the tomb of Halicarnassus and is said to be unique in the world at present.

A Lively Mausoleum.

It is the liveliest kind of mausoleum, for it contains a sprinkler tank, a fire tank, a house tank, elevator, ventilating machinery, the main stack (which is six feet in diameter) and forty-seven storage rooms for the use of the tenants. It has a base of 70 by 69 feet and has twenty-three steps outside. This pyramid alone, which really impresses the man down in the street as a comparatively insignificant part of the building, is 95 feet high.

There are forty-one stories altogether piping, about 3,500 miles of wire for electrical appliances, 552 vacuum cleaner attachments, 15,000 incandescent lamps and enough motors and pumps and compressors and engines to run a good sized town. If all this is true of the Singer Tower, what will be the statistics for the new buildings?

Monster Switchboard Used.

In the basement of the Woolworth building now there is a switchboard as large as that in a big hotel; and yet it is simply an item of the construction period and will disappear entirely when that is over. All the concrete for the work is mixed in the basement too. Half a dozen big mixers are distributed over the place. Tons of sand and hundreds of bags of cement are there. Thousands of bricks are heaped at one end. When the reporter was going about with the superintendent the latter said to one of the foremen: "Hello, Dave! How's youre brick pile? Getting rather low? Well, there's 40,000 bricks on a barge down at the pier. I'll have them send them up."

from a perfect vertical. This is considered a remarkable achievement, especially in connection with the speed with which the building has gone up. The first stone was laid February 1, 1911, and the skeleton was up and the stonework complete by September 15, an astonishing record of forty-one stories in eight months.

Of course one of the modern ideas in putting up a tall building is not so much to see as to be seen. The Metropolitan Tower people secure the attention of some undreds of square miles of territory by using a single great cluster of lights at night. The Singer people on the other hand bid for attention by having searchlights directed against the sides of the tower, making it visible for twenty miles. The lantern on top of the tower contains a searchlight that taps sixty or seventy miles of darkness. The Woolworth Building will follow the Metropolitan's example and have a powerful electric bunch of lights, which, so it is promised, will be visible fifty miles, or almost as far as the Singer's searchlight, which of course is used only on occasion.

The details of the new skyscrapers are the things that astonish the foreign visitor to New York even more than their immensity. After he has tipped his head back a few degrees he doesn't discriminate when it has to go another one or two. But he can't stop stuttering with amazement, except when he becomes dumb with the same emotion, over the trimmings of life in a skyscraper. Before Mr. Woolworth decided on even tentative plans for the huge building he spent two years studying the buildings of this country and those abroad. The types of work were so different that he finally settled down to a study of American conditions and methods.

Astonishes the Foreigner.

The foreigner who examines American skyscrapers is confronted with something as new to him as it is beyond his power of imitating. And as before remarked, it isn't only the immensity of the construction but the complexity of the various installations. In every room of the new buildings connection can be had with the vacuum cleaning equipment, not only for the purpose of room cleaning but for such trifles as hat brushing. Nobody knows as yet whether an automatic shoe blacking equipment will be devised for the coming skyscraper, but nobody will be surprised if it is.

In the basement of the Woolworth there will be a swimming tank. The court inside the building will be as wide as a city street and there will be enough stairs to run up a mountain almost 4,000 feet high. When it comes to cost another high water mark is reached. For the entire undertaking $13,000,000 was required and the financing of the scheme was injected into foreign financial circles, as if it were a railroad or any other industrial flotation. A little more than half the sum was secured from foreign sources, most of it from France. The building itself will cost $7,500,000, of which amount almost one-third is for the foundation alone.

The developments to come in the next twenty years can scarcely keep on in the same giant jumps—one can't say strides—of the last two decades. The number of stories to-day is more than twice it was then. At that rate people would be soaring serenely to the 125th floor in 1935, which seems unworthy of serious contemplation. But fifty-five stories would have made the present generation's ancestors laugh just as scornfully.

Mr. Ernest Flagg, who was the architect of the Singer tower, didn't turn a hair when he was asked whether it would be possible with present methods This is partly because except for a general floor plan the arrangement of each suite will be made to suit the tenant. By modern methods a much more elastic construction is secured. It used to be the custom for the architect to plan the arrangements of rooms and tenants took them as they stood or secured what minor changes they could browbeat the agent into making. The newest skyscraper has been planned so that tenants can be supplied with anything from an 8 foot office to a whole floor arranged to order.

Some idea of what the statistics will be when they are finally made up can be had from a comparison of the new building with the Singer Tower. The Singer has forty-nine stories, the Woolworth will have fifty-five; the former has about 20,000 square feet of floor space, the latter will have close to twice as much. The Singer Building has 136 miles of metal

That gives an idea of the amount of stuff stored constantly inside a skyscraper in course of construction. There will be 17,000,000 common bricks used in the Woolworth walls.

The immense care with which these great structures are put up is proved in the case of the Bankers Trust Building. When the exterior walls were completed the architects made minute examinations and found that the greatest variation from mathematically exact vertical lines from the base to the cornice (about 500 feet) was five-eighths of an inch at one corner. Two of the corners were absolutely vertical throughout their entire elevation.

Columns Never Varied.

When it came to the steel columns the greatest variation from the exact perpendicular was about three-eighths of an inch, while a large number of these columns showed no variation whatever

of construction to put up a building 2,000 feet high. He merely said: "Bring on the man to pay for it and I can put it up. The only thing to be secured is an adequate base. It is all a matter of mathematical calculation. As a general proposition the base should be a tenth of the height. If the building is 1,000 feet high the base should be 100 feet square. But that is only a general statement. Everything has to be worked out mathematically."

When Mr. Flagg designed the Singer tower it was twice as high as any commercial building that had been previously erected. He says he would willingly design one now more than double the height of the loftiest one yet undertaken. But for all that he doesn't believe in skyscrapers. He thinks they are a mistake, artistically, economically and from the point of view of health.